GROWING FAMILIES™...

A Newsletter For Those Who Care For Childbearing Families and Neonates

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©GESTATIONAL DIABETES... CARE DURING PREGNANCY

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Behavioral Objectives: After reading this newsletter the learner will be able to:

1. **Discuss risk factors, diagnostic criteria, and management of GDM.**
2. **Describe maternal, fetal and neonatal effects of GDM, as well as implications for the healthcare provider.**

Pregnancy is a time of dramatic physiological change in the woman's body. Every body system is affected by these changes, brought about in many cases by hormones that appear during pregnancy or existing hormones whose levels fluctuate during this period. One disorder that may result from these physiological changes is gestational diabetes mellitus (GDM), glucose intolerance that appears for the first time during pregnancy. This disorder affects an estimated 3 - 5% of pregnant women.

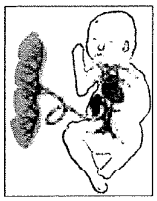
All three types of diabetes, type 1, type 2, and GDM, can affect women who are pregnant. The unique aspect of gestational diabetes is that it occurs or is recognized for the first time during pregnancy. Women with GDM commonly have no symptoms, and unlike women with pre-existing diabetes, no knowledge that they have this condition during their pregnancy. But, like the other forms of diabetes, GDM can result in very serious adverse effects on the fetus and newborn. For these reasons, it is critical that GDM be diagnosed and managed as early as possible in pregnancy.

This newsletter will discuss GDM, including pathophysiology, risk factors, diagnostic criteria, and treatment. Maternal, fetal and neonatal effects of GDM will be highlighted, as well as the healthcare provider's role in assisting the woman to manage GDM through appropriate education and support.

GDM—CAUSE AND EFFECTS

Pregnancy, particularly in the second and third trimesters, is generally considered a diabetogenic state, one that predisposes the woman to glucose intolerance. Complex changes occur in carbohydrate metabolism, as well as production and use of insulin, a hormone produced by the pancreas. In normal amounts, insulin "unlocks" the door to the body's cells, so that glucose can move from the blood stream into the cell, where it is used for energy.

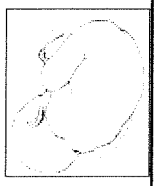
During pregnancy, progressively increasing levels of placental hormones and enzymes occur, such as estrogen, progesterone, human placental lactogen (hPL) and insulinase. These substances act as insulin antagonists, decreasing the sensitivity of the body's tissues to insulin. Therefore, glucose cannot move as effectively from the blood stream into the cells. Hyperglycemia, an abnormal increase in blood glucose levels, then occurs, causing a variety of serious health problems.



Since the fetus is completely dependent on maternal glucose supplies for energy, this diabetogenic effect of pregnancy is thought to be a protective mechanism for the fetus. That is, ensuring that adequate amounts of maternal glucose cross the placenta for use by the fetus.

Hormone levels continue to rise progressively during the second and third trimesters. Consequently, the amount of insulin produced by the maternal pancreas must increase significantly, by up to three times the normal amount. Most women are able to meet this extra demand, but some cannot. These women are at risk for development of GDM, typically diagnosed during the second or third trimester. Most women with GDM return to a normal metabolism and blood glucose levels after the pregnancy ends. These women are at increased risk, however, for development of GDM in future pregnancies, and for developing type 2 diabetes later in life.

The physiologic effects of GDM are significant, for both the mother and fetus/newborn. In the mother, GDM is associated with an increased risk of pregnancy-induced hypertension, infections, polyhydramnios, birth trauma, and cesarean birth. Possible risks to the fetus/newborn include sudden intrauterine death, macrosomia - excessive fetal weight, birth trauma, and neonatal hypoglycemia, hyperbilirubinemia, and polycythemia.



RISK, SCREEING & DIAGNOSIS

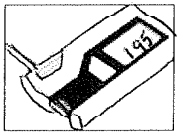
An important key to controlling the risks associated with GDM is the identification and treatment of those affected. The American College of Obstetricians and Gynecologists (ACOG) recommends screening of all pregnant women for GDM, whether by history, risk factors, or laboratory testing.

While any pregnant woman could potentially develop GDM, the disorder is more common among certain groups.

Risk factors for GDM include:

- obesity
- maternal age > 25 years
- strong family history of diabetes
- African-American, Hispanic, Native American or Asian ethnicity
- GDM in a previous pregnancy
- previous birth of a large infant (>4000 gm or ~9 lbs)
- previous unexplained fetal death

Laboratory screening for GDM is commonly done using a 50g-1 hour glucose challenge test at 24—28 weeks gestation. Depending on criteria used, a normal blood glucose value is <130 or <140 mg/dl. Patients who exceed these values undergo a 100g-3 hour oral glucose tolerance test. The National Diabetes Data Group suggests that GDM be diagnosed if any two or more of the following blood glucose values are met or exceeded:



Fasting: 105 mg/dl
1 hour: 190 mg/dl
2 hour: 165 mg/dl
3 hour: 145 mg/dl

In women at high risk for GDM, the 1-hour screen may be omitted, and the 3-hour test done early in pregnancy.

MANAGEMENT OF GDM

Diabetes is a complex disorder, requiring a multi-disciplinary approach for optimum treatment. Because of the risk to herself and her baby, the woman with GDM has a formidable task—to learn a great deal about this disorder in a short period of time, and effect immediate control of blood glucose levels to promote the best outcome.

Women with GDM may not realize the significance of this disorder, considering it "temporary" and routine. They must first understand the risks associated with GDM and the need for ongoing treatment and medical supervision. Then, the importance of glucose control through diet, exercise, and medication, if needed, must be emphasized for a healthy pregnancy outcome.

The goal of treatment for GDM is to keep blood glucose levels within normal limits, and to avoid abrupt or significant changes in blood glucose throughout the day. Capillary glucose levels < 105 mg/dl fasting and <120 mg/dl 2 hours after meals are considered acceptable. Regular home glucose monitoring allows the woman and physician to monitor her response to treatment. Education for self-testing includes use of equipment, normal blood glucose values, finger-stick technique, recording of values, and actions required for high or low values.

Many women are able to control GDM with dietary modifications and exercise. A referral to a registered dietician should be made whenever possible. A healthy diet of lean meats, fruits, vegetables, and whole grains, taken in 3 meals and 3 snacks per day, helps to keep blood glucose levels stable and within normal limits. Moderate, regular exercise, such as walking, has been shown to benefit the mother and fetus by lowering blood glucose levels.

If diet and exercise are not sufficient to normalize blood glucose levels, pharmacologic treatment is required. The drug of choice for GDM is insulin, administered via subcutaneous injection or pump.

While oral hypoglycemic agents have long been avoided in pregnancy due to concerns regarding efficacy and fetal safety, a newer-generation sulfonylurea agent has shown promise in testing. Glyburide was shown, in one study, to achieve results similar to those of insulin in treating GDM, without adverse fetal effects. Further testing of this drug is warranted before it is used on a large scale for this purpose.

Ongoing fetal surveillance is also important to monitor the growth and health of the fetus. Ultrasound may be performed to confirm fetal age and evaluate for possible macrosomia and polyhydramnios. The fetus may also be monitored periodically using antenatal tests such as the nonstress test or biophysical profile, beginning at 32 weeks or later. Women who have poor glucose control, are taking insulin, or who have complications, such as hypertension, require more frequent and intensive monitoring. A decline in fetal well-being may require prompt delivery, via induction of labor or planned cesarean birth if the estimated fetal weight is over 4500 gms (9lb 15 oz).

The woman with GDM, and her family, may feel overwhelmed by the amount of information needed to manage GDM, and anxious about the risks involved. A warm, caring approach, frequent reinforcement of instructions, and a supportive environment all help to promote a healthy outcome for the childbearing family and newborn.

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